SII – Sustainability Innovation Inventory

Authors: Abby Spinak, Dave Chiu, Federico Casalegno,
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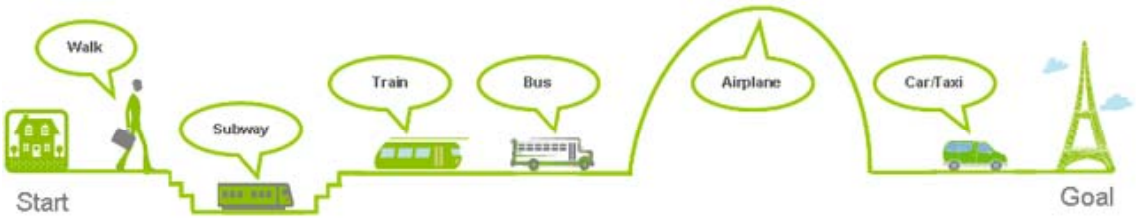
Pedestrian / Multimodal Navigation Devices



(Image from: www.navitime.com)

Executive Summary

GPS navigation systems have become standard in cars, but what about for pedestrians? Technology that encourages people to get out of their cars and navigate cities on foot and via public transportation can contribute to a city's overall social and environmental sustainability. A handheld navigation guide for urban pedestrians can also plan trips around public transportation availability, which will build confidence in the ability of public transportation to get pedestrians to where they are going as easily as a personal car.

Two companies, Navitime and Humanware, both recently developed personal navigation tools that get travelers out of their cars. Navitime's urban navigation software, which is downloadable onto any GPS-enabled mobile phone, provides users with comparisons of different transportation options, gives turn-by-turn voice instructions, uses real-time data about potential delays, and locate nearby businesses and services. Alternatively, Humanware sells a product called Trekker, which is a dedicated device for navigation that also helps pedestrians plan routes through a city using real-time data, figure out where they are using GPS technology, and find businesses and services; as a device intended to help the visually impaired navigate the city, Trekker also includes special audio functions.

Sustainability

Both devices encourage urban multimodal mobility, focusing on different key features. Navitime is intended to encourage healthy and sustainable travel options. In addition to route options, Navitime calculates estimated calories burned for routes requiring walking and expected CO_2 emissions for routes requiring driving (Navitime). Thus, travelers can weigh travel options based on four quantifiable factors: time, cost, health benefits, and environmental impact. Similar to Nissan's "Eco-Drive and You" program, Navitime offers tips for travelers who choose to drive to help them improve their fuel efficiency on the road (greenz.jp, 2008).

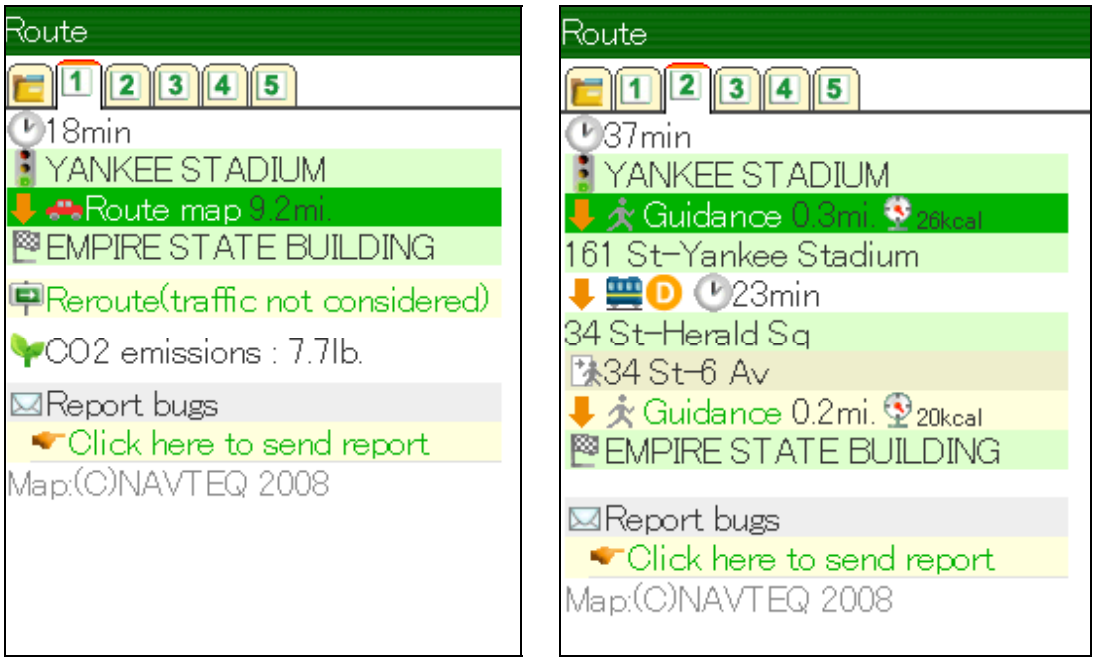


Figure 1: Navitime Route Options. *Route comparisons let travelers know how many calories they will burn walking (Route 2, right) or how much CO_2 emissions they will produce driving (Route 1, left). (Images from www.navitime.com)*

Trekker helps with both social and environmental sustainability. It allows visually impaired travelers to be more adventurous, but also allows them to take public transportation and walk around unfamiliar cities, rather than taking a cab or hiring a driver.

Figure 2: Trekker in Use. *Trekker helps the visually impaired explore new neighborhoods or navigate cities.*

Technology

Figure 3: Trekker (left) and Navitime (right) *are easily transportable handheld navigation devices.*

Both Trekker and Navitime use GPS and digital maps to let a traveler determine his or her exact location and find nearby businesses, restaurants, and services. Navitime "is designed to work with the small CPU and memory of a cellular phone" and, in fact, is available for free to English-speaking users with GPS-enabled cell-phones until October 2008 (Navitime). Trekker comes with a designated device that includes a GPS receiver, PDA-like functions (including WiFi and Bluetooth, applications for note-taking, schedule, and contact information management, etc.), and integrated microphone, speakers, and headset components. Trekker weighs 600 g (1.3 lbs) and is a little larger than the average Blackberry® device (Trekker). The Trekker headset attachment, which gives users the option of hearing street names as they pass by, is a small device that looks similar to IPod headphones (Bruno, 2006).

Current Navitime software lets a user plan multimodal trips by combining personal mobility options (e.g. walking, driving) with public (e.g. trains, buses, ferries) and commercial (e.g. planes, taxis) services. It additionally provides up-to-date cost and travel time estimates for each combination of options. Where available, it incorporates real-time traffic information in its travel time estimates. For users on the road, Navitime provides the option of voice navigation. As mentioned above, Navitime also provides expected vehicle emissions data for car trips and estimated calories burned for walking trips, to help travelers weigh environmental and health considerations with time and cost during trip planning (Navitime). For Japanese users, Navitime is also developing commercial software to help companies plan travel and product shipment with greater attention to environmental impact (greenz.jp, 2008).

Current Trekker software allows users to plan and record multimodal routes before travel. During travel, Trekker allows users to record places of interest along a route and create personal retraceable "paths" in unmapped areas such as fields, parking lots, business and college campuses, and bodies of water. During vehicle travel, Trekker gives users regular updates on their speed and location, and will alert them if they are going off-route – for example, if a dishonest taxi driver is driving a circuitous path (Wolffe, 2005).

Because these are relatively new technologies, mapping and navigation functions for both Navitime and Trekker are still actively being extended to incorporate new locations. Navitime is currently available in Japan and select cities in the United States (including Boston, Chicago, Las Vegas, Los Angeles, New York, and Philadelphia, as of April 2008). Other cities and languages are in

development for future Navitime software releases (Navitime). Current Trekker software only supports English, but other language options are being developed for the device (Humanware).

Technology and Experience Roadmap

As emerging technologies, Trekker and Navitime have much to learn from each other's features, as well as from other initiatives to improve urban mobility and information access.

Traffic/Parking Monitoring

Knowledge of what lies ahead, either on the road or at one's destination, may encourage use of public transportation during heavy traffic. By combining route data with real-time traffic and parking data (for example, see Nokia's Mobile Century project and the SFpark initiative), Navitime and Trekker can help users avoid unpleasant surprises and, at the same time, reduce congestion by keeping potential drivers off the roads. While Navitime already uses some traffic data, recent initiatives to use GPS-enabled cell-phones as traffic monitoring devices have the potential to extend its route planning capabilities significantly. Navitime is part of a larger class of technology initiatives that have recently turned to the personal mobile phone as a promising device for large-scale data collection, analysis, and dissemination; coordination of these efforts will be the next step towards making the human world a more connected and comprehensible environment.

Friendly Competition

Like Nissan's Eco-Drive and Oberlin College's CRMS, Trekker and Navitime could improve their contribution to urban sustainability by including a competitive aspect in their technology – for example, by providing individual travelers with information on all users' carbon footprints, miles walked per month, different kinds of transportation used, and so on. Eco-Drive and CRMS both found that showing individuals how their behavior compares to the average encouraged significant behavior change. For example, if a die-hard car commuter sees that she has a higher-than-average carbon footprint for her company, she may reconsider her daily routine, especially if her personal navigation device offers helpful suggestions for how to reduce her environmental impact. Or, a health-conscious resident who notices that he walks less than his neighbors may make a conscious effort to run more errands on foot.

Other Disabilities

Visual impairment isn't the only handicap that makes multimodal trips an unworkable option. Cities can often be difficult, if not downright impossible, to navigate for disabled people dependent on wheelchairs or crutches, or even for healthy adults pushing strollers or transporting large objects. Sidewalks are not always wide or even enough, elevators at public transportation stations are sporadically out-of-order, and weather poses an unpredictable hurdle. Prior knowledge of these obstacles through a feature that matches personal mobility limitations with regular updates of city conditions could enable personal navigation devices to help users navigate around these obstacles, stick to well-maintained walking paths, and find accessible public transportation stops.

Works Cited and Sources for Additional Information:

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MIT Mobile Experience Lab, Massachusetts Institute of Technology

Design Laboratory

School of Architecture and Planning

http://mobile.mit.edu

Federico Casalegno

Dave Chiu

Abby Spinak

Cisco Systems, Inc.

Internet Business Solutions Group

http://www.connectedurbandevelopment.org/

James Macaulay

Nicola Villa

Shane Mitchell

CONNECTED URBANDEVELOPMENT